

Impact of Different Organic Manures in Enhancing the Growth and Productivity of Rice (*Oryza Sativa* L) in Rural Bhandara (M.S.) India

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Abstract: Organic manure refers to materials used as fertilizer that occur regularly in nature, usually as a by-product or end product of a naturally occurring process. Organic fertilizers such as manure have been used in agriculture for thousands of years; ancient farmers did not understand the chemistry involved, but they did recognize the benefit of providing their crops with organic material. In order to study the effect of organic fertilizer on growth and yield components in rice, an Experiment was conducted during year 2022 in mid-August to December in field as well as in pot with five different nutritional treatments such as Cow, sheep, vermicompost, Poultry manures and combined of all four nutrients and one pot for control to evaluate the growth, productivity of growing rice. Under such a management practices the growth parameters yield components and seed yield of rice were maximum when organic manure was applied along with inorganic fertilizer at certain conditions. The effect of cow dung cake manure was good over the effect of vermicompost and it showed better result over manures like sheep, Poultry etc. The best result was found in Combination of all nutritional treatment.

Keywords: Vermicompost, Organic manure, poultry manure, nutritional treatment

I. INTRODUCTION

Rice (*Oryza sativa* L.) is a plant belonging to the family of grasses, Gramineae (Poaceae). It is one of the three major food crops of the world and forms the staple diet of about half of the world's population. Rice is staple food crop of 63 to 65 per cent people of India. The crop at present is grown in 43 million hectares of land with production of 96.7 million tones. Its production has to be raised to 160 million tons by 2030 with a minimum annual growth rate of 2.35 per cent (Mishra *et al.*, 2013). The fertilizers contribute about 40-60% of the food production worldwide. Developing best fertilizer management practices should include the use of fertilizers in an effective, efficient and safe manner to ensure sufficient crop production specially in the developing countries.

The use of organic manure in conjunction with chemical fertilizers has the potential to improve soil fertility and crop output. It is an ecofriendly and non-polluting approach in improving the crop productivity. Integrated plant nutrition systems, particularly using organic manure, could improve crop productivity in intensive cropping systems. Organic manure has lately been discovered to be an excellent source of plant nutrients in the soil. A large part of the available amount cow dung is used for preparing cow dung cakes for fuel purpose as well as for organic manures. Another benefit from the increased use of organic materials is that it can help to solve pollution problems caused by agro-industrial wastes. However, the soil must not be seen as a dumping ground for organic wastes. If too much nitrogen fertilizer is applied, whether in the form of organic matter or chemical fertilizer, some of the excess nitrogen is converted to nitrates, which are harmful to human health (Preapet *et al.* 2002)

II. MATERIAL AND METHOD

An Experiment was conducted during year 2022 in mid-August to December in field as well as in pot with five different nutritional treatments such as Cow, sheep, vermicompost, Poultry manures and combined of all four nutrients and one pot for control to evaluate the growth, productivity of growing rice. Under such a management practices the growth parameters yield components and seed yield of rice were maximum when organic manure was applied along

with inorganic fertilizer at certain conditions. The effect of cow dung cake manure was good over the effect of vermicompost and it showed better result over manures like sheep, Poultry etc. The best result was found in Combination of all nutritional treatment.

2.1 Field Experiment

In the field experiment five same size areas are used for different nutritional treatment

Each with the gap of 2.5 feet to evaluate the exact results and assure that will be no any mixing of any nutritional treatment. The soil was analysed before the experiment in order to determine the amount of nutrients present in the soil and study the result of total nutritional value and effect of treatment on soil before and after experiment. Same quantity of five different manures such as cow, sheep, poultry, vermicompost and combination of all manures in equal amount are used in five different plot areas. The rice crop (Sundar 120 days) was transplanted in the end of august .after transplanting plant height and number of tillers were studied at the time of harvest. The growth parameters like leaf area index (LAI), crop growth rate (CGR) were studied at interval of 30,60 90, days after. Total nitrogen, phosphorus and potassium available in rice plants were estimated by modified Macro- Kjeldahl's method, Olsen's method and flame photometric method respectively (Jackson, 1967).

2.2 Pot Experiment

In order to study Pot Experiment Same size of pots are used. The weight of empty pot and pot filled with soil is weighed and difference between both of pots is calculated to know the amount of soil present in single pot. same treatment as given in field is given to pot crop plants .The growth parameters like leaf area index (LAI), crop growth rate (CGR) ,height of leaf, were studied at interval of 30,60 90, days after. In pot experiment no of Panicles in single pot and no of grains in each panicles present is also counted.

III. RESULT AND DISCUSSION

Calculation of growth Parameters Leaf Area Index (in field experiment)

Sr no	Different organic manures	Growth parameters		
		Leaf area index (in cm)		
		No of days		
		30	60	90
1	Control	49cm	65cm	80 cm
2	Cow	60cm	92cm	120cm
3	Sheep	52cm	84cm	100cm
4	Vermicompost	86cm	95cm	115cm
5	Poultry	65cm	79cm	92cm
6	Combination of all organic manures	98cm	106cm	134cm

Estimation of nitrogen, phosphorus and potassium present in leaf mid phase of cycle in field experiment

Sr no	Parameters	Cow	Sheep	Vermi compst	poultry	Combination	Control
1	Nitrogen	1084 kg/ha	792 kg/ha	993 kg/ha	682.6 kg/ha	2016kg/ha kg/ha	50 kg/ha
2	Phosphorus	305kg/ha	149 kg/ha	301kg/h	139 kg/ha	373.24 kg/ha	192.2 kg/ha
3	Potassium	196 kg/ha	128 kg/ha	192 kg/ha	102 kg/ha	216.51 kg/ha	98 kg/ha

No of Panicles and No of grains in each panicles in Pot Experiment

Sr no	Parameters	Cow	Sheep	Vermi compost	Poultry	Combination of all Organic Manures	Control
1	No of panicles in (single pot)	169	102	128	101	177	80
2	No of grains in Each Panicle	83	82	112	76	139	51

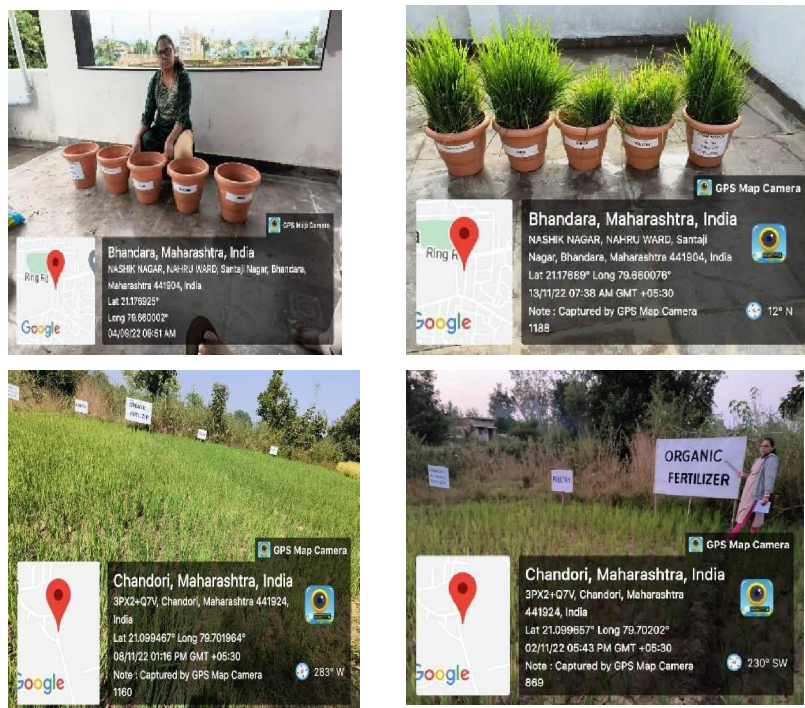


Figure: Images Taken During Experiment in Pot and Field Experiment

IV. CONCLUSION

Use of Organic manures over chemical fertilizers has the potential to improve soil fertility and crop output. It is an ecofriendly and non-polluting approach in improving the crop productivity. Another benefit from the increased use of organic materials is that it can help to solve pollution problems caused by agro-industrial wastes. The effect of cow dung cake manure was good over the effect of vermicompost and it showed better result over manures like sheep, Poultry etc. The best result was found in Combination of all nutritional treatment

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